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The Châtelaine to the right, in form of a small bag (*Châtelaine aumônère Louis XIII*) is also executed in red, highly polished gold. The watch is placed in the bag, the key contains a little pencil-case, the upper clasp shows a monogram of two interlaced Cs.

Plate 21. Ceiling of the Chamber "*il Paradiso*" in the Ducal Palace in Mantua.

This most charming chamber of the rich suite of apartments in the Ducal Palace in Mantua, decorated by Giulio Romano in 1527 for the highly gifted Isabella d'Este, widow of Francesco Gonzaga, is covered by the ceiling here represented, the smaller engraving showing the soffit of the great window recess of the room. Both ceiling and soffit are in stucco, richly gilt, relieved by a deep blue ground for the darkly tinted parts of the engravings. The centre of ceiling is enriched by the armorial bearings of Isabella d'Este; the device: "*nec spe, nec metu*", the initials of her name, alternating with ornament of symbolical meaning are judiciously distributed in the panels.

The dimensions of the chamber without window recess are 4 m. in length, 3 m. in width and 4 m. in height. The drawing can give but a feeble idea of the ingenious and skilful disposition of the delicate ornament of this rich ceiling.

Plate 22. — Table and Chair in dark-stained Oak, from the design of O. Fritzsche, by A. Pössenbacher, Furniture Manufacturer in Munich.

Plate 23. — Niello Ornament, designed and executed by P. and A. Stotz, Art Metal Workers in Stuttgart.

Plate 24. — Plate, Limoges Enamel, sixteenth century work. In the Museum of the Louvre in Paris.

Great efforts have been made recently to revive the art of enamelling, in all its different branches; and especially painted enamels have come into great favor, either for articles of personal ornament, the enamels being mounted in brooches, lockets, rings, &c., or for rich incrustation in caskets, fancy furniture, and *articles de luxe*. Quite independently of other artistic processes, enamels are also used for ornamenting dishes, vases and plates without the combination with gold, silver and other precious materials.

It will therefore be useful to call attention to the exquisite examples of the Renaissance period. The last International Exhibition in Paris has been immensely successful in uniting numerous private collections in the Trocadero Palace, but great riches of this kind are also found in the Museums of the Hotel de Cluny and of the Louvre.

Amongst the great number of articles, principally figure subjects, we have chosen this flat plate, 0,70 m. in diameter. It is painted on the convex surface and has in the centre a round opening for receiving the foot. This must have been of some height to be in harmony with the ornament which is intended to produce an effect analogous to that of a centre or ceiling flower.

From an early date we find the Art of Enamelling practised in France, and Limoges was the important centre for the work. The time of its greatest splendor and purest style was during the period of Italian influence on French art under Francis I, in the second half of sixteenth century. The most celebrated enamel painters of this time were Léonard and Jean Pénicaud, Léonard Limousin, Pierre Raimond and three members of the Courtois family.

The process of manufacture may be thus described: A plate of copper, more or less flat, was covered with a layer of dark colored enamel which formed the ground for painting in *chiaroscuro*. The details were either painted on in opaque white, the shades being represented by the dark colored ground with hardly, if any white, or the plate was again coated with a thin, white layer of enamel, the dark parts as in *sgraffiti*, being scratched through this white covering, before the baking, so as to show portions of the ground. Lights and details were picked out with white and gold. Flesh tints were used for figures, and colors were put on the dark ground with the same ease as in oil-painting on canvas. The oldest and finest examples of Limoges enamel were always worked in *chiaroscuro*, or *grisaille*, in the manner just described. A later period is marked by the profuse use of foil and the overrichness of coloring, and during the eighteenth century the enamel painting is hardly to be distinguished from porcelain painting, which has taken its place.

VARIOUS.

Bronze Alloys.

A bronze in imitation of gold may be made of 45·5 parts copper, 3·5 parts tin and 1 part zinc—50 parts. Bronze metals are generally cast of an alloy of 50 parts copper and 2·8 parts tin. This alloy is very hard. A softer bronze for medals than the above is composed 46 parts copper and 4 parts tin. Ancient bronze nails were made of 40 parts copper to 1 part tin, and were very flexible. Soft bronze is composed of 18 lb. copper to 2 lb. tin. Hard bronze is composed of 20 lb. copper to 5 lb. tin. The ancient bronze mirrors are said to have contained 60 parts copper to from 7 to 8 parts tin. At the time of Louis XIV. of France, a period when the art of casting statues was much cultivated in France, statues were cast of an alloy of 30·6 parts copper, 0·11 parts tin, 2 parts zinc, and 0·6

parts lead. The statue of Louis XV. is cast of 82·4 parts copper, 10·3 parts zinc, 4 parts tin, and 3·2 parts lead. The bronze of the ancient Greeks consisted chiefly of copper and tin, but was frequently alloyed with arsenic, zinc, gold, silver and lead. All their shields and weapons of war were made of bronze, as well as coin, nails, kitchen utensils, &c. All the ancient nations seem to have understood the art of tempering bronze and copper, and the ancient Mexicans understood the art of converting bronze into edged instruments in a high degree, but the art of tempering and hardening bronze and copper has been lost to modern nations; but as we understand the working of iron better than the ancients, and have steel, an alloy of iron and carbon, which the ancients did not have, we do not miss this art much.

Iron.